

RNNs for Operator Occupational Risk Analysis based on Multimodal Biosignals

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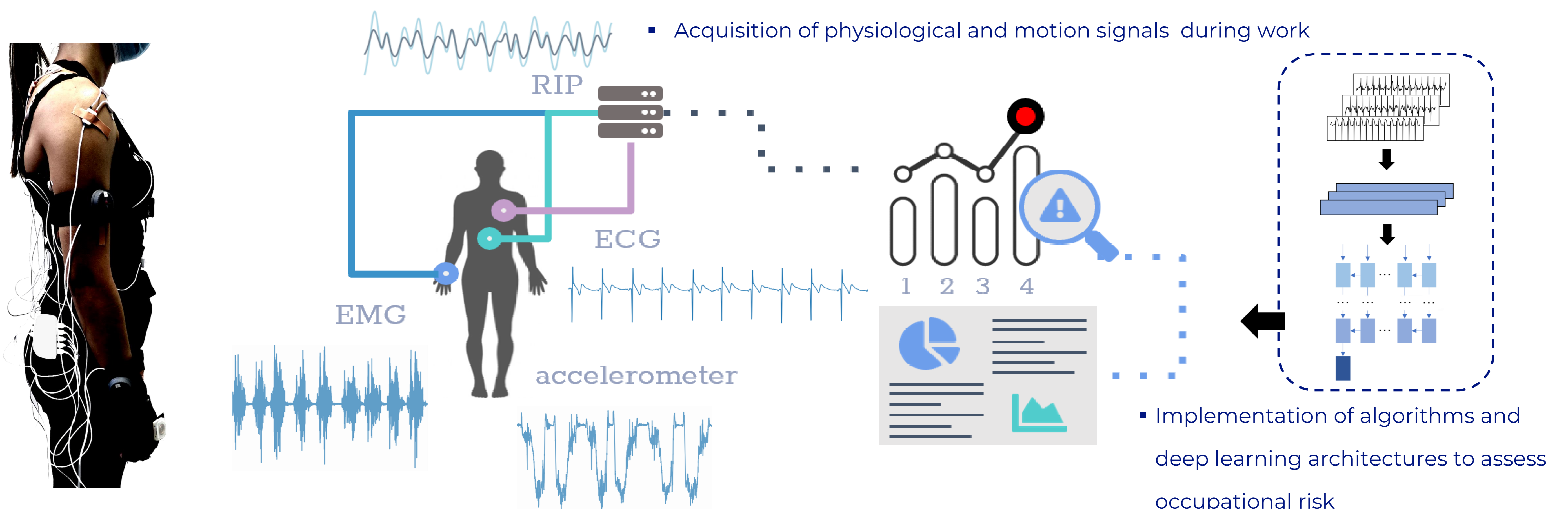
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Objectives

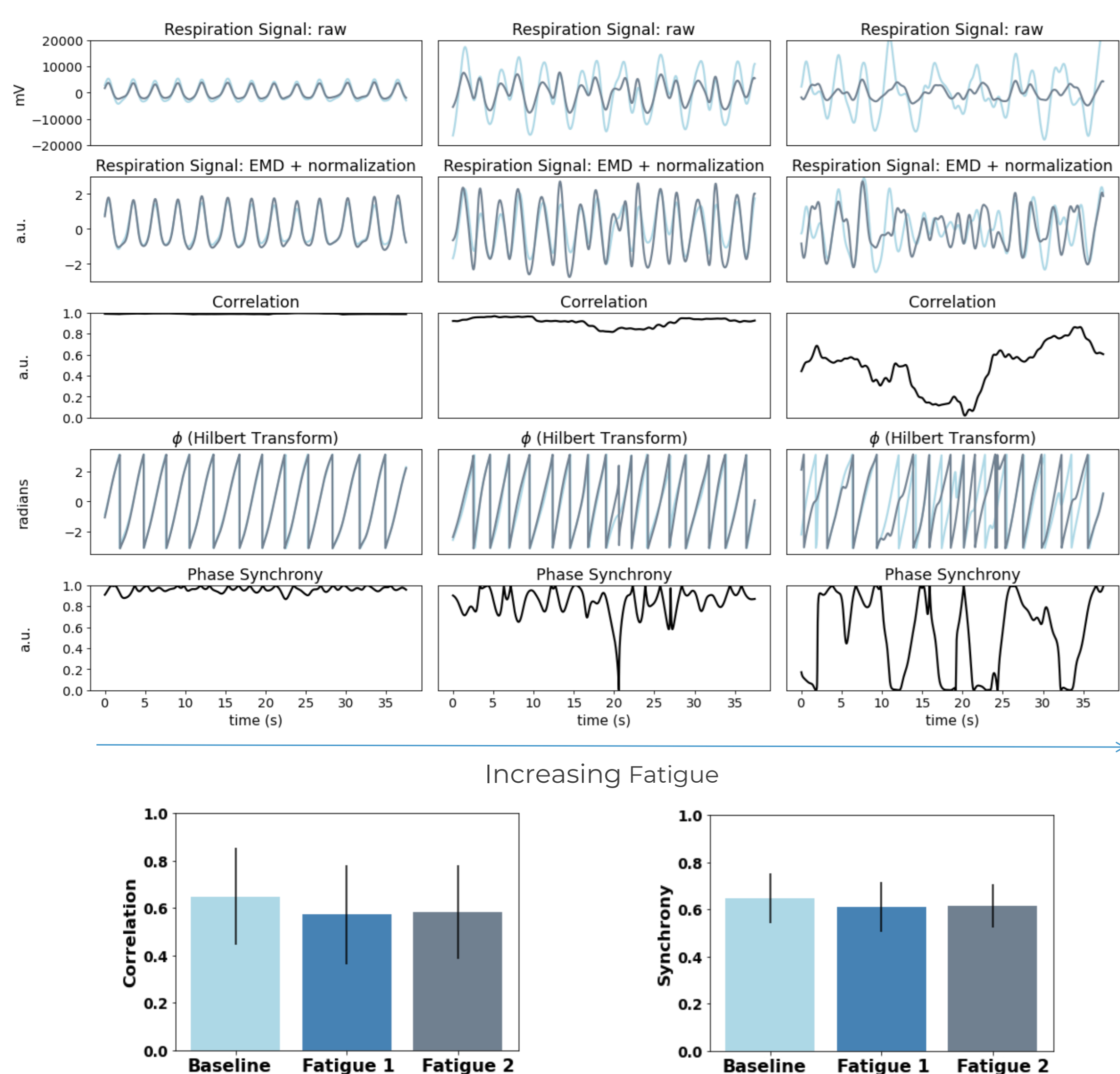
- Understand the occupational factors that affect the well-being and productivity of the worker
- Contribute to the MIT-Portugal project "Operator - Digital Transformation in Industry with Focus on the Operator 4.0"
- Promote a design for a work assessment and risk prevention framework, through a "human in the loop" strategy

Methodology



Respiratory Inductance Plethysmography

Synchrony between chest and abdominal respiration decreases with fatigue.

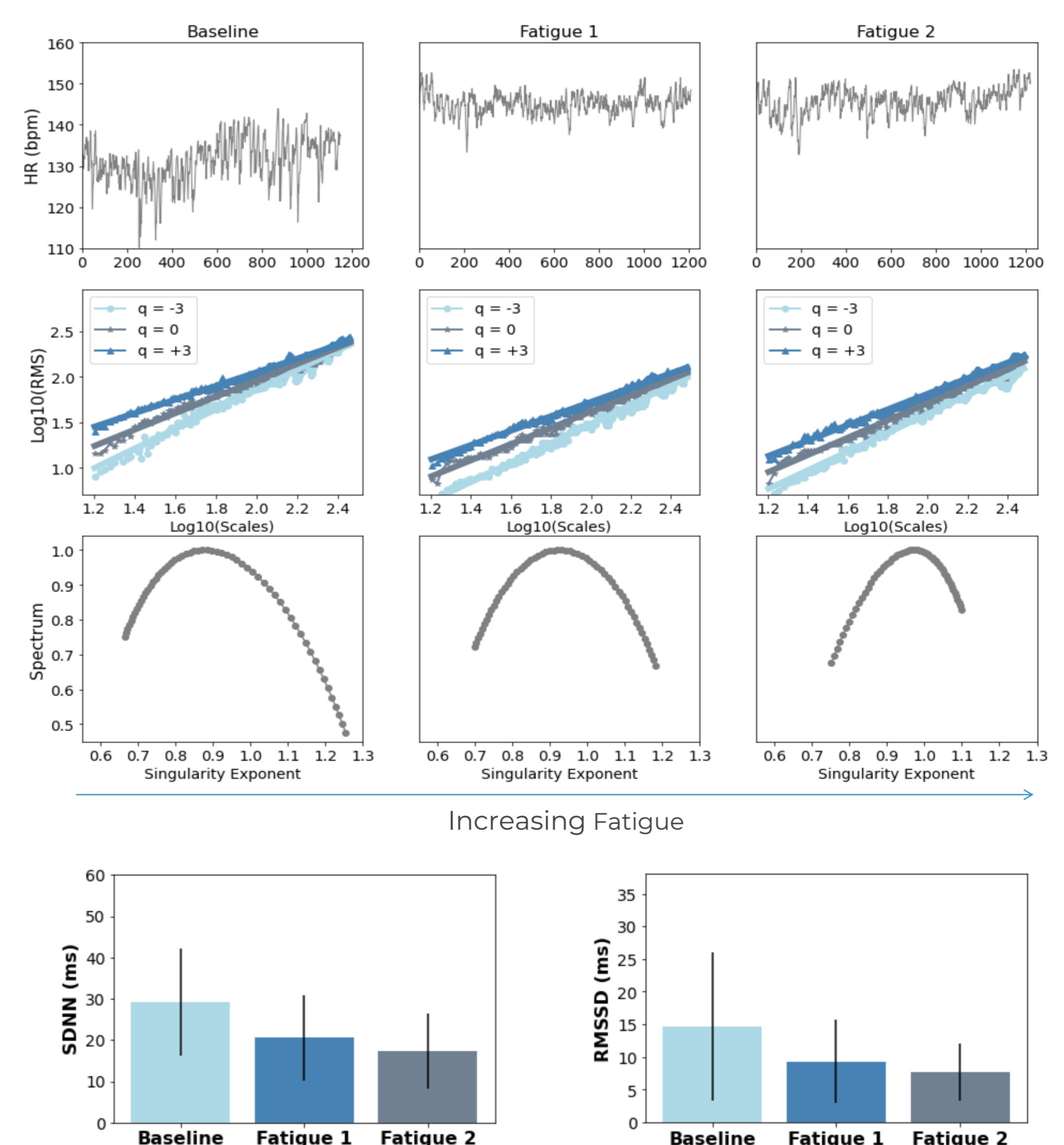


In a pilot study that consisted in a simulation of repetitive work with induced muscular fatigue, correlation and phase synchrony between abdominal and chest respiration were measured and decreased with augmented fatigue.

Silva, L.; Dias, M.; Folgado, D.; Nunes, M.; Namburi, P.; Anthony, B.; Carvalho, D.; Carvalho, M.; Edelman, E.; Gamboa, H. Respiratory Inductance Plethysmography to Assess Fatigability during Repetitive Work. *Sensors* **2022**, *22*, 4247. <https://doi.org/10.3390/s22114247>

Heart Rate Variability

Heart Rate Variability decreases with fatigue, but its fractal structure is maintained.



In the same simulation of repetitive work with induced muscular fatigue, HRV (measured by the linear variables SDNN and RMSSD) also decreased with augmented fatigue.

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